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# **Implementation of Evidence-Based Practice from a Learning Perspective**

Per Nilsen

Department of Medical and Health Sciences and HELIX VINN Excellence Centre,  
Linköping University, Linköping, Sweden

Margit Neher

Department of Medical and Health Sciences, Linköping University, Linköping, Sweden

Per-Erik Ellström

HELIX VINN Excellence Centre and Department of Behavioural Sciences and Learning,  
Linköping University, Linköping, Sweden

Benjamin Gardner

Department of Psychology, Institute of Psychiatry, Psychology and Neuroscience, London,  
UK

Address correspondence to: Per Nilsen, Department of Medical and Health Sciences,  
Linköping University, Linköping, Sweden. [per.nilsen@liu.se](mailto:per.nilsen@liu.se)

Short title: EBP from a Learning Perspective

## Abstract

**Introduction:** For many nurses and other health care practitioners, implementing evidence-based practice (EBP) presents two interlinked challenges: acquisition of EBP skills and adoption of evidence-based interventions, and abandonment of ingrained non-evidence-based practices. The aim of this article is to describe two modes of learning and use these as lenses for analysing the challenges of implementing EBP in health care.

**Theoretical background and applying learning theory to understand the challenges in implementing EBP:** Adaptive learning involves a gradual shift from slower, deliberate behaviours to faster, smoother and more efficient behaviours. Developmental learning is conceptualized as a process in the “opposite” direction, whereby more or less automatically enacted behaviours become deliberate and conscious. The mechanisms by which the two modes of learning occur are explained with reference to habit theory.

**Discussion:** From a learning perspective, EBP will be best supported by means of adaptive learning that yields a habitual practice of EBP such that it becomes natural and instinctive to instigate EBP in appropriate contexts by means of seeking out, critiquing and integrating research into everyday clinical practice as well as learning new interventions best supported by empirical evidence. However, the context must also support developmental learning that facilitates disruption of existing habits to ascertain that the execution of the EBP process and/or the use of evidence-based interventions in routine practice is carefully and consciously considered to arrive at the most appropriate response.

**Keywords:** Evidence-based practice, Nursing practice, Research utilization, Theory

**Bullet points:** Linking evidence to action

- Learning theory can provide important insights that can enhance our understanding of the challenges involved in implementing evidence-based practice (EBP).
- Adaptive learning involves a progression from deliberate to more automatically enacted behaviours, whereas developmental learning is a process in the “opposite” direction, whereby more or less automatically enacted behaviours become deliberate and conscious.
- EBP is supported by means of adaptive learning that yields a habitual practice of EBP such that it becomes natural and instinctive to seek out, critique and integrate research into everyday clinical practice as well as to learn new interventions supported by empirical evidence.
- The practice context must also support developmental learning that facilitates disruption of existing habits to ascertain that the execution of the EBP process and/or the use of evidence-based interventions in routine practice is carefully and consciously considered to arrive at the most appropriate response.
- Achieving a more EBP depends on both adaptive and developmental learning, which involves both forming EBP-conducive habits and breaking clinical practice habits that do not contribute to realizing the goals of EBP.

## Introduction

Interest in evidence-based practice (EBP) has grown exponentially since the concept was introduced in the 1990s. Originating in medicine, as evidence-based medicine (EBM), the evidence-based movement has become a global phenomenon, transcending national, cultural and professional boundaries. EBP is intended to provide a stronger scientific foundation for professional practice, to achieve consistency, efficiency, effectiveness, quality and safety in health care. Health care authorities, policy-makers, leaders and researchers have emphasized the importance of implementing EBP. The Institute of Medicine of the USA has identified EBP as a central competency for all health professions and aims for 90% of decisions in health care to be based on optimal evidence by 2020 (McClellan, McGinnis, Nabel, & Olsen, 2007). The International Council of Nurses (2007, p. 1) considers a research-based practice a “hallmark of professional nursing”.

EBP was originally conceived as a problem-solving process (also referred to as a decision-making or a critical appraisal process) comprising five steps to be undertaken by the practitioner when faced with clinical uncertainty: formulating an answerable question based on a patient’s problems; seeking out the best relevant evidence; critically appraising the validity and usefulness of this evidence; integrating this appraisal with practice and patient preferences; and assessing the results (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996). Practitioners must therefore acquire numerous “EBP skills” to implement EBP. Simplified versions of the complex EBP process have been described, proposing that the extent to which each step is performed is determined by the patient condition encountered, time constraints and the level of expertise with the different EBP skills (Straus & McAlister, 2000). However, research has shown that implementing these steps in routine practice is difficult because the process requires considerable skills, resources and time (Gerrish et al., 2012; Kajermo et al., 2010). Reflecting on the implementation of EBP in health care, Aveyard and Sharp (2013, p. 143) recently concluded that EBP is “not as commonplace as we would like to see”. Similarly, Ramos-Morcillo, Fernandez-Salazar, Ruzafa-Martinez, and Del-Pino-Casado (2015, p. 199) argue that integration of EBP into the clinical practice of nurses has “proceeded at a slower pace than desirable”.

A second conceptualization of EBP has emerged in response to the challenges of carrying out all the steps of the problem-solving process in routine practice. According to this definition, EBP also refers to the adoption and use of various empirically supported interventions (programmes, methods, services, etc.), which may be recommended in guidelines produced by government agencies and professional organizations (Midgley, 2009; Olsson, 2007). This view of EBP is concerned with “what works,” i.e. the extent to which specific interventions have been established as effective according to some explicit criteria. However, research shows that evidence-based interventions are not used routinely by health care practitioners, as many continue using interventions that have little or no evidence and many rely more on their experience than on research (Gray, 2009; Sigma Theta Tau International Evidence-Based Practice Task Force, 2004).

For many nurses and other health care practitioners, implementing EBP presents two interlinked challenges: acquisition of EBP skills and adoption of evidence-based interventions, and abandonment of ingrained non-evidence-based (or “evidence light”) practices. This article proposes that learning theory may provide important insights that can enhance our understanding of the implementation of EBP and, by extension, the acknowledged difficulties involved in this endeavour. The aim of this article is to describe two modes of learning and use these as lenses for analysing and discussing the challenges of implementing EBP in health care.

## Theoretical Background

We propose that two modes of learning, adaptive and developmental learning, can inform understanding of applying optimal practices and abandonment of existing suboptimal practices. The mechanisms by which these modes of learning occur are explained with reference to habit theory. Habit theory is founded on a dual process model of behaviour, whereby an action may arise through a relatively slow and mentally effortful deliberative reasoning process (i.e. a reflective processing system) or via a more rapid and immediate process involving non-conscious activation of stored associations (i.e. an automatic system) (Strack & Deutsch, 2004). We first describe the two learning processes before considering how they may underpin the implementation of EBP.

### *Adaptive Learning*

Learning to handle a certain task in a routinized way has been conceptualized as adaptive learning. This mode of learning involves a gradual shift from slower, deliberate behaviours to faster, smoother and more efficient behaviours, yielding increasingly efficient, effective and reliable task performances (Ellström, 2001, 2006). Adaptive learning typically involves a conversion of explicit knowledge to implicit (or tacit) knowledge. This process, termed internalization in Nonaka and Takeuchi's (1995) theory of learning in organizations, occurs through habit formation.

Habits form when a behaviour is repeated in a specific context. This reinforces associations between the behaviour and features of the context (e.g. an environment) in which the behaviour is usually performed, to the extent that perceiving the context cues automatically activates an impulse to enact the behaviour, without requiring prior forethought, effort or conscious control (Gardner, 2015a; Neal, Wood, & Quinn, 2006). Unless the impulse is suppressed, it transitions smoothly and unconsciously into action (Gardner, 2015b). Over time, control over behaviour is thus delegated from effortful deliberative processes to contextual cues. Context is usually interpreted broadly, to encompass external triggers such as physical environment, time, preceding actions and other people, but can also be understood in terms of emotional states that trigger thoughts and behaviours (Verplanken, 2005; Wood, Quinn, & Kashy, 2002).

For many behaviours, a distinction can be made between habitually instigating a learned behaviour (i.e. automatically resorting to a well-known range of behavioural options) and habitually executing the behaviour ("performing" the steps within a behavioural sequence, with the completion of each composite action triggering the next action within the sequence) (Gardner, 2015a; Phillips & Gardner, 2015). In this way, a behaviour may be regulated by both habitual and conscious processes; for example, it may belong to a nurse's habitual repertoire to examine a patient (habitual instigation), but she or he may carry out actual examination of the patient with attentive cognitive awareness (non-habitual execution). Research on various clinical practices, e.g. taking dental radiographs, placing fissure sealants and managing low back pain, suggests that habits play an important role in instigating such behaviours (Eccles et al., 2012; Grimshaw et al., 2011; Pesseau et al. 2014).

### *Developmental Learning*

Whereas adaptive learning involves a progression from deliberate to more automatically enacted behaviours (i.e. reflective to automatic processing), developmental learning is conceptualized as a process in the "opposite" direction, whereby more or less automatically enacted behaviours become deliberate and conscious (i.e. automatic to reflective processing) (Ellström, 2001, 2006). Developmental learning may occur when an individual critically reflects on previously implicit assumptions and unconscious thought and

action patterns. This process often involves making implicit knowledge explicit, which is termed externalization by Nonaka and Takeuchi (1995) in their theory of learning in organizations.

The automatization of everyday actions that occurs through habit formation frees cognitive capacity for devotion to alternative tasks, and so allows us to function effectively and efficiently on a daily basis. Much well-rehearsed health care practice can be expected to depend on instigation habits (Presseau et al., 2014; Rochette, Korner-Bitensky, & Thomas, 2009; Nilsen, Roback, Broström, & Ellström, 2012). However, when unfamiliar problems or new situations arise, e.g. a patient presenting with symptoms that are unknown to the nurse or physician, habitual responses built up through experience may not suffice and we must engage in a deliberative processing to find possible explanations or solutions.

Shifting from automatic to more deliberate action necessitates overruling or breaking habits. The occurrence of unexpected problems offers a window of opportunity to inhibit or block activated habit impulses prior to their translation into the habitual behaviour (Gardner, 2015b). This may require considerable willpower or self-control, made more difficult when a person is experiencing stress or devoting mental resources to cognitively effortful tasks (Neal, Wood, & Drolet, 2013). Contextual changes also offer a possibility of limiting habitual responses. A discontinuation of exposure to habit cues can enable practitioners to reconsider a behaviour and bring behavioural decision-making under conscious control (Verplanken, Walker, & Jurasek, 2008). For example, reminders of appropriate indications and computerised decision support can decrease the number of routine chest X-rays in an intensive care unit (Sy et al., 2015).

## **Applying Learning Theory to Understand the Challenges in Implementing EBP**

This section applies the two learning modes for improved understanding of the difficulties involved in implementing EBP and discusses potential strategies to address the challenges that arise from our analysis. Both conceptualizations of EBP, i.e. the problem-solving process of EBP and specific evidence-based interventions, require adaptive and developmental learning for successful implementation (Figure 1). The two learning processes exist in parallel, with some aspects of a task depending on adaptive learning and other aspects requiring developmental learning.

Figure 1. Learning challenges involved in implementing EBP.

Mode of learning involved in implementing EBP		
Conceptualization of EBP	Adaptive learning	Developmental learning
	EBP problem-solving process	Evidence-based interventions
	Acquiring EBP skills and using them in regular practice	Avoiding over-reliance on clinical practice habits to enable the application of the EBP problem-solving process in regular practice
	Learning evidence-based interventions (programmes, methods, services, etc.) and providing them to patients as part of regular practice	Modifying or discarding habitual attitudes, beliefs, knowledge and behaviours that hinder learning and effective use of new evidence-based interventions in regular practice  De-implementation to abandon current interventions that are not sufficiently evidence-based

### *Adaptive Learning Involved in Implementing EBP*

The challenge of acquiring the EBP skills necessary to execute the steps of the problem-solving process can be described in terms of adaptive learning. Integration of the various knowledge forms of EBP (i.e. experience, evidence and patient preferences) is usually considered the most difficult step of the process, with the preceding steps having been described as “the easy bit” (Aveyard & Sharp, 2013, p. 143).

EBP skills are increasingly taught in health care practitioners’ basic and continuing professional education. However, despite a proliferation of EBP materials, a consistent research finding is that perceived poor “EBP literacy” and inadequate time to apply the full EBP process constitute major barriers to successfully implementing EBP in health care (Croft, Malmivaara, & Van Tulder, 2010; Straus, 2007). The knowledge integration step, a “core challenge” for attaining an EBP (Reynolds, 2000, p. 27), has received limited research attention. This means that there is a lack of hands-on guidance concerning how to combine different knowledge sources in everyday clinical practice and how such skills can be improved. Turpin and Higgs (2010, p. 308) believe the understanding of this critical integration is “still in its infancy”.

Adaptive learning is also involved in the implementation of EBP by means of specific evidence-based interventions, e.g. a standard measurement tool with excellent psychometric and pragmatic properties or a new type of treatment with convincing evidence. Considerable training as well as ongoing supervision and consultation concerning the performance of new interventions may be necessary before they can be delivered in sufficient quantity and quality to patients. Practice settings tend to be busy and lack adequate training infrastructure

(Lindhe-Söderlund et al., 2008; Soydan & Palinkas, 2014). It has been suggested that research on best training strategies and measures for evaluating training is at an early stage (McHugh & Barlow, 2012).

Barriers to adaptive learning to implement the EBP process are well established, including factors such as time restrictions, limited access to research, poor confidence in skills to identify and critically appraise research, difficulties in interpreting guidelines and inadequate support from colleagues and managers (Bucknall & Rycroft-Malone, 2010; Mittman, 2012). Barriers to learning new evidence-based interventions typically include insufficient training quantity and quality, limited training budgets, lack of supervision, monitoring and consultation (Aarons, Wells, Zagursky, Fettes, & Palinkas, 2009; Chan et al., 2010; Powers, Bowen, & Bowen, 2010; Swain, Whitley, McHugo, & Drake, 2010).

### *Developmental Learning Involved in Implementing EBP*

Implementing EBP by means of applying the problem-solving process also depends on health care practitioners' developmental learning to detect and avoid over-reliance on clinical practice habits built up from experience. Ingrained clinical practice habits reduce the likelihood that practitioners engage with the steps of the EBP process, e.g. neglecting to track down the best available evidence or scrutinizing research for its potential application in clinical practice (Rochette et al., 2009). For example, a practitioner who is unfamiliar with the latest research concerning the benefits of physical exercise in rheumatic disease may rely on old textbooks and continue to prescribe rest as a way to achieve pain relief. Developmental learning may be particularly relevant to accomplish the knowledge integration step and to allow research findings to challenge existing taken-for-granted responses to various patient problems (Nilsen, Nordström, & Ellström, 2011). In many ways, a well-established, largely habitual clinical practice represents a "comfort zone" (Rushmer & Davies, 2004).

Developmental learning might also come into play when implementing EBP in terms of learning evidence-based interventions and providing them to patients as part of regular practice. For instance, health care practitioners often have difficulties adjusting to the communication style of motivational interviewing due to the patient-centred approach of this counselling technique, which contrasts with the traditional model of an expert provider and a passive recipient (Lindhe-Söderlund et al., 2008). Developmental learning is necessary to enable health care practitioners to modify or discard habitual attitudes, beliefs, knowledge and behaviours that have become "incomplete, dangerously flawed, or simply incorrect" (Rushmer & Davies, 2004, p. ii2) and may hinder learning new interventions. People do not learn onto a "clean slate", but preexisting thought and action patterns can make new learning more difficult (Macdonald, 2002; Schumacher, Madson, & Nilsen, 2014).

Research on habits shows that adequate developmental learning can be difficult to achieve. The habit literature has shown that frequently performed behaviours in stable contexts are unlikely to be spontaneously reconsidered or changed (Wood, Tam, & Guerrero Witt, 2005). Individuals who have formed habits become less likely to act on new knowledge and may even avoid input that challenges the present habitual behaviour. As habits form, people appear to form fixed expectations and preferences for certain behaviours in associated contexts, which reduces their sensitivity to a change in outcomes that might otherwise result from alternative behaviour (Webb, Sheeran, & Luszczynska, 2009).

Furthermore, developmental learning is also necessary to question and potentially cease the use of interventions that obstruct a more EBP, e.g. a diagnostic or treatment method that does not have a sufficiently strong evidence base to justify its continued use. De-implementation refers to the abandonment of interventions that are known not to work or have an uncertain evidence base. Research suggests that there are a large number of



interventions in use where the evidence shows no efficacy or where harms outweigh benefits (Prasad & Ioannidis, 2014). There are many types of de-implementation barriers beyond individual resistance to change, including historical, economic, professional and social forces that reduce the likelihood of de-implementation (Montini & Graham, 2015).

De-implementation can be a difficult and even threatening process for health care practitioners who have developed high levels of expertise in the interventions that are discontinued. As noted by Goss and Rowland (2000, p. 193), “It is, perhaps, unsurprising that the possibility of having research demonstrate the superiority of a competing approach over one’s own may be met with some resistance and skepticism.” What we have learned and become experts in can be deeply attached to and intertwined with our way of thinking and acting, identity, position and very being (Buchan, 1998; Wheeler & Hicks, 1996).

Organizations and other collective units, such as teams or communities of practice, can also restrict changes to clinical practice, as they strive for predictability and stability. The prevailing culture of groups and organizations impose norms, values, priorities and expectations that influence individuals’ thought and action patterns, potentially constraining developmental learning (Schein, 2004). There is increasing interest in understanding the forces and mechanisms that yield resistance to practice change, as implied in the concept of developmental learning. Research thus far on de-implementation in health care is limited, but there is emerging research on health care practitioners’ habits (and dual processes) that can provide important insights into clinical practice.

### *Potential Strategies to Achieve Adaptive and Developmental Learning Involved in Implementing EBP*

Implementation of EBP depends on both adaptive and developmental learning. It is important to emphasize that both modes of learning have important functions in most organizations and should be seen as complementary (Ellström, 2006). Health care practitioners must not only learn new skills and interventions, which we have proposed can be understood in terms of adaptive learning, but must also abandon suboptimal practices, which can be understood as developmental learning; that is, practitioners must not only acquire “good” habits that contribute to the goals of EBP but also remove their “bad” habits that hinder implementation of EBP.

Implementing EBP requires considerable training, time and resources for practitioners to learn and develop proficiency in routinely applying the steps of the EBP process in regular practice and to provide evidence-based interventions to patients in sufficient quality and quantity. It is important that continuing professional education courses and materials devote particular attention to the challenges of the “knowledge integration” step of the EBP process and address how pre-existing attitudes, beliefs, knowledge and behaviours might hinder learning new practices.

Adaptive learning is facilitated by repeating behaviours in a stable context, which underscores the importance of performing the behaviours in the context of the regular work environment and situations. Hence, EBP skills and knowledge acquired in formal learning situations must be transferred to and executed in routine practice to enable health care practitioners to form “EBP-conducive” habits. This means that formal learning must be combined with informal learning in practice to achieve the necessary adaptive learning. Whereas formal learning is structured, often classroom-based, with an instructor or trainer planning and implementing the learning taking place, informal learning refers to learning resulting from natural opportunities that occur in everyday life when a person controls his or her own learning (Eraut, 2004).

Informal learning can be just as planned and intentional as formal learning, which points to the relevance of using various mentoring and supervision strategies since they offer

an opportunity to bridge the “theory” and practice of EBP, thus converting explicit knowledge into implicit knowledge required for adaptive learning. “EBP mentors” who are knowledgeable and experienced in relevant research and EBP issues could actively support the EBP process and delivery of evidence-based interventions as intended, through feedback, advice and guidance.

Achieving developmental learning represents a profound challenge since there are barriers to changing an established practice at many levels, from the individual health care practitioner’s ingrained habits that ensure effectiveness, to the culture of various collective entities which influences individuals’ patterns of behaviour through its shared norms, values and expectations. It is important to raise awareness of existing practice and the extent to which there may be automatically cued habits that are not conducive to EBP. This may be difficult to accomplish through individual reflection since people often are not aware of their habits. However, formal, scheduled and management-supported reflection and discussion with colleagues and managers might provide opportunities to detect taken-for-granted behaviours that are contrary to EBP. While it is the individual health care practitioner who ultimately decides whether or not to “do” EBP, the ambitions of EBP will never be realized unless there are sufficiently supportive organizational conditions.

## Discussion

This article has addressed implementation of EBP in health care from a learning perspective. Health care practitioners’ behaviours are described as developing from deliberate to more automatically enacted behaviours, based on habit theory that posits that behaviours repeated in a stable context become habitual through a process of adaptive learning. Developmental learning involves self-monitoring and/or contextual disturbances that disrupt ingrained habitual responses and so facilitate more conscious, mindful behaviours that make it possible to search for new, creative ways of dealing with problems.

The importance of developmental learning was strongly implied in the original description of critical appraisal and the decision-making procedure of EBM, as the early evidence-based movement explicitly set out to challenge practitioners’ own “unsystematic clinical experience” (Evidence-Based Medicine Working Group, 1992, p. 2420). However, contrary to the original intentions of EBM to question existing clinical practice, the evidence-based movement has increasingly become associated with adaptive learning by means of adherence to clinical guidelines and use of evidence-based interventions with fidelity to protocols to reduce diversity and heterogeneity (Timmermans & Mauck, 2005).

In many ways, it seems that the (implicit) developmental learning agenda of EBP has faded into the background. EBP critics argue that implementation of EBP yields uniformity and standardization rather than fostering health care innovation, renewal or development (Cohen, Stavri, & Hersh, 2004; Timmermans & Mauck, 2005). Furthermore, critics have suggested that the adaptive learning associated with EBP might even lead to de-professionalization because practitioners stagnate when they can use pre-packaged protocols instead of having to rely on their own judgment and decision-making abilities (Horwitz, 1996; Straus & McAlister, 2000; Timmermans & Mauck, 2005). For instance, Gabbay and LeMay (2011) believe that there is a risk that practitioners feel the pressure to “do” EBP to the extent that they unquestioningly apply results from studies conducted in populations that are quite different from their regular patients or that they use guidelines and knowledge summaries without recognizing the shortcomings in the underlying research. Offloading tasks to various types of aids can free up mental resources for other tasks, yet research on automation in various fields of work suggests that attention tends to drift and complacency

sets in when tasks can be solved without our full attention (Carr, 2015). Such a development in health care would clearly be in conflict with the original ambitions of EBM/EBP.

It is clear that EBP represents considerable learning challenges for nurses and other practitioners in health care and other areas who are expected to implement EBP and conduct practice in accordance with the principles of this approach. The literature on EBP and its application has largely focused on the adaptive learning involved in developing required EBP literacy. In contrast, the relevance of developmental learning needed to achieve a more EBP has not been recognized to the same extent. Indeed, “getting people to stop doing things as well as getting new practices started” has been identified as a neglected step in attaining a more EBP (Nutley, Davies, & Tilley, 2000, p. 5). Although learning new skills, i.e. adaptive learning, is usually associated with positive feelings of increased personal confidence and self-respect (Illeris, 2009), research on habits and de-implementation suggests that developmental learning can be difficult to achieve.

Ultimately, achieving a more EBP depends on both adaptive and developmental learning, which involves both forming EBP-conducive habits and breaking clinical practice habits that do not contribute to realizing the goals of EBP. From a learning perspective, EBP will be best facilitated by developing habitual practice of EBP such that it becomes natural and instinctive to instigate EBP in appropriate contexts by means of seeking out, critiquing and integrating research into everyday clinical practice as well as learning new interventions best supported by empirical evidence. However, the context must also facilitate disruption of existing habits to ascertain that the execution of the EBP process and/or the use of evidence-based interventions in routine practice is carefully and consciously considered to arrive at the most appropriate response.

## Competing interests

The authors declare that they have no competing interests.

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